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Statement of

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

before the

Subcommittee on Space Science and Applications
and the
Subcommittee on Transportation, Aviation and Materials
House of Representatives

Mr. Chairmen and Members of the Subcommittees:

It is a pleasure to appear today to present President Reagan's budget request for NASA for Fiscal Year 1983. The total request is $6.613 billion of which $5.334 billion is for Research and Development, $100 million is for Construction of Facilities, and $1.179 billion is for Research and Program Management. A chart summarizing the request is appended to this statement.

During his first year in office, the President has clearly stated the two major policy priorities of the Administration. The first is to revive our economy and the second is to strengthen our national security. The control of inflation has been identified as this Administration's primary economic objective. Since inflation is related to spending by the government, the total request, as submitted, reflects significant steps to reduce spending in FY 1983. At the same time, the military and political threat posed by the Soviet Union has increased steadily during the past two decades. Improving the Nation's defense posture is clearly the second major priority of the Administration. The FY 1983 budget request for the National Aeronautics and Space Administration has been prepared to be consistent with these broad and over-riding priorities.

Before turning to the details of the request, I would like to review the significant contributions and challenges which I foresee for the Agency in the coming fiscal year.

The United States has conducted a vigorous space program for almost a quarter century under the broad policy guidelines set by the Congress in the National Aeronautics and Space Act of 1958. This far-sighted piece of legislation has made it possible to conduct a program in both the public and private sectors that has led to truly remarkable scientific and technical achievements and to ever-increasing investments in terms of real dollars in aviation and space operations.

The large commercial communications satellites now in geostationary orbit are the direct technical descendents of NASA's early Applications Technology Satellites. The relative stability of the world today is dependent to a considerable extent on national security related satellites employing technology that was pioneered by NASA in the 1950's and 1960's. The success of this technology transfer to the commercial and military sectors is demonstrated by the fact that NASA today accounts for a smaller fraction of the national spending on space-related activities than in the past even though the NASA budget has remained relatively constant in real year dollars for the past few years. The national security related space program and the commercial programs have both seen very substantial increases in the past five years. These increases are related to important national security requirements as well as new commercial opportunities. The ability to satisfy these requirements and to exploit these opportunities is due in large measure to the work performed by NASA over the years.

In accord with the Administration's policies, NASA's FY 1983 program shows the retention of, or increases in, those programs that can be related directly to national security. We have also maintained a strong program in those fields directly related to the responsibilities of NASA under the National Aeronautics and Space Act. However, some programs have been reduced or delayed because of the urgent need to reduce federal spending. We have heard expressions of concern that this balance of priorities can lead to the "militarization" of the agency. I would like to assure you, Mr. Chairmen, that this Administration is strongly committed to the maintenance of an independent NASA charged with pioneering new enterprises and technologies that will enhance the ability of the United States to conduct operations in space and aeronautics that further the objectives laid out in the National Aeronautics and Space Act and maintain the competitive posture of this country in aeronautics and space technology.

We are conducting our support of agencies with responsibilities in the area of national security under the provision of the Act that requires NASA to make "available to agencies directly concerned with national defense of discoveries that have military value or significance....."(Section 102(c)(6)). The case of aeronautics is a particularly important example. The President, in submitting his strategic force modernization program to the Congress in October 1981, has made commitments in excess of $50 billion for the next decade to create a new generation of strategic aircraft. The B-1B bomber, a variation of the B-1 configuration, has already benefited heavily from NASA support in the design process. A large fraction of the 26,000 hours of wind tunnel time used to develop the B-1 configuration was performed in NASA facilities. We expect to provide comparable support in other defense-related areas such as advanced avionics and the so-called "stealth" technologies. NASA's aeronautics program has been structured to provide full support for those aeronautical programs that are vital to the national security as well as the high priority needs of the commercial aeronautics programs.

The past year was a historic one for the development of new capabilities in space. The first flight of "Columbia" in April was a milestone that marks a fundamental change in the way space operations will be conducted in the future. The second flight in November was the first time that a spacecraft has been reused in its entirety - flown again, and recovered. The original concept of a reuseable spacecraft that was developed by NASA in the late 1960's has therefore been proved and the nation can be justifiably proud of this achievement.

We have fully funded the important elements of the Shuttle program in our FY 1983 request. The highest priority we have set for NASA is to complete the development of the Shuttle and to turn it into an operational system. Safety and reliability of flight and the control of operational costs are primary objectives as we move forward with the Shuttle program. We are continuing to take the necessary technical and management steps to make certain that safety will not be compromised and that reliability will exceed that of our current generation of launch vehicles. Cost control is equally important to the viability of the system. This aspect is sharpened by the serious competition for launch services that we now face from abroad.

The steps which we shall take to control the cost of Shuttle operations will fall into two broad categories: first, we will reduce the number of people necessary to conduct Shuttle operations. We believe that this can be accomplished through a number of incremental steps, as we gain flight experience, without compromising safety and reliability. We plan to make a careful analysis of the actions which we must carry out to plan and conduct Shuttle operations. This analysis will include requirements and procedures for flight planning, payload integration, vehicle servicing, test and checkout. We will then be in a position to streamline our civil service and contractor structures to match those requirements. Second, we must reduce the cost of producing the consumable items used for each flight and of refurbishing the items that are reused from flight to flight. The external fuel tanks are perhaps the best example of what we have in mind. We believe that substantial production cost reductions are possible as we make necessary investments to automate production procedures. In other areas I expect flight experience to lead to design changes which will permit operational cost savings.

We have made some significant program reductions in various areas in order to help meet the Administration's objective of fighting inflation by reducing federal spending. These reductions have been made in those portions of our aeronautics and space applications programs where we believe it is appropriate for the private sector of our economy to play a larger role. It is important to recognize that we have not reduced spending on basic research and technology that could support new initiatives in civil aviation or in space applications. What we have done is to reduce our work in systems technology and in technology demonstration programs in which performance by the private sector appears appropriate.

We have also reduced some of our activities in space science and space exploration. In making these reductions, we have placed the highest priority on work in astronomy and space physics because we believe that discoveries of an unusually important and fundamental nature will soon be forthcoming in these important areas. We have therefore funded both the Space Telescope and the Gamma Ray Observatory. There is good reason to believe that the Space Telescope, to be launched in 1985, will be the most important scientific instrument ever flown. Observation of objects such as quasars, Seyfert Galaxies, and the remnants of large supernova events will almost certainly lead to new information about the origin of the universe.

We have retained the Gamma Ray Observatory for launch in 1988 for the same reason--because gamma rays are probably the most sensitive indicators of what happens in objects where very energetic processes are occurring. We have made some reductions in our planetary exploration program, most significantly, deletion of the Venus Orbiting Imaging Radar mission, but we have retained funds for the Galileo mission in the FY 1983 request. The planetary program realized enormous success in the last decade. We believe, however, the time has come to reevaluate this program and to set new direction for the future. Several scientific study groups within and outside NASA are now studying the future of the planetary exploration program. We believe that the outcome of these studies could lead to the development of some less expensive missions for the late 1980's and early 1990's as well as more ambitious concepts such as manned visits to earth-crossing asteroids and perhaps the nearby planets in the years to follow.

As noted earlier, the policies the Administration is developing to shape the future of the American space and aeronautics program are consistent with the National Aeronautics and Space Act. They provide for the retention of two administratively separate activities in space--one related to the national security and another related to essentially civilian activities. While this separation is maintained, we are working actively to strengthen relationships at all levels between NASA and those elements in the national defense establishment for activities in space related to the national security. You will see evidence of this when you examine the details of our program. We strongly support this administrative separation and believe that the arrangement has served the national interest well in the past and will continue to do so in the future.

A fundamental requirement of the Space Act is to preserve the role of the United States as a leader in space technology. For the last decade the major policy objective of the space program has been to provide routine access to space. To implement this policy objective we have created the Space Shuttle. Although we still have much work to do to turn the Shuttle into an operational system, we believe that the time has come to examine some possible new policy objectives and to plan the technological initiatives required to implement them. For example, an operational Space Shuttle leads to the possibility of establishing permanent facilities and a permanent presence in space. We are critically examining the possibility of establishing a permanent presence in space, as a major national initiative in space and have begun appropriate discussions within the Administration to this end.

Several other policy and institutional issues are currently under review by study groups organized under the auspices of the Office of Science and Technology Policy. These include studies dealing with institutional arrangements in aeronautics and in Space Shuttle operations and with technical questions concerning the stable of launch vehicles that the Nation's space operations will require in the future. We expect that these studies will be complete in the late spring or summer of this year. NASA is well represented and deeply involved in these studies and we believe they will provide a new insight into the national aeronautics and space endeavor.

Finally, I would like to say a word about the NASA organization. In the past six months we have made some organizational changes that will hopefully make it easier for me to spend more time on the major policy questions that I have just outlined. We have improved communications and streamlined overall management control by reducing the number of people who report directly to me. We have consolidated the Offices of Space Science and Space Applications into one organization to strengthen the common technical and management elements inherent in the previously separate organizations. We have broadened the authority and responsibilities of the Program Associate Administrators by having the field centers report directly to them rather than to me. I believe that the organizational steps we have taken will make it possible to delegate authority more readily and improve the overall operation of the organization. In the coming months, we will be taking other organizational steps with these objectives in mind.

Mr. Chairmen, I would now like to proceed with an overview of NASA's FY 1983 program.

SPACE TRANSPORTATION SYSTEMS

For Space Transportation Systems the request of $3.468 billion for FY 1983 will move us out of Shuttle development flight test and evaluation and into the initial stages of operations. The past year marked significant gains toward providing the nation with an operational space transportation system. The key element of this system, the Space Shuttle, has completed two of its four planned orbital flight tests. Both flights, STS-1 and STS-2, were highly successful.

STS-1 accomplished all major flight objectives and demonstrated the viability of the total system. STS-2 fulfilled 90% of planned high priority flight objectives, demonstrated the reusability of the orbiter vehicle and its ability to support payload requirements. In both flights the astronauts reported the orbiter exhibited exceptionally good handling characteristics. The thermal protection system performed better than expected with anomalies well below that expected on first flights. Based on these results, we are approaching the next two orbital flight tests with confidence.

During the current fiscal year we will complete the last two orbital flight tests and accept delivery of the second orbiter vehicle, Challenger, now scheduled for this June. At the Kennedy Space Center prelaunch preparations are underway for STS-3 and the first line of Space Shuttle processing facilities and ground support equipment which supported the STS-1 and STS-2 launches are fully activated and a number of second line processing facilities are nearing completion.

SPACE SHUTTLE

The budget request for Space Shuttle in FY 1983 is $1.718 billion. By the coming fiscal year we will have completed basic development and flight test of the Shuttle, and therefore are not requesting funds for DDT&E. However, $72.5 million is requested for changes and systems upgrading to initiate modifications to improve reliability, increase operating efficiency and reduce costs. These funds allow for potential changes and systems modifications and unanticipated developments not included in the budget for production.

Our FY 1983 budget request for Space Shuttle production is $1,585.5 million for such activities as the orbiters, main engines, spares and equipment. Manufacturing of orbiters will continue on a schedule consistent with the needs of the Department of Defense and civil users.

For orbiter activities, we are requesting $933.5 million to cover such activities as OV-103 systems installations, factory checkout, and the thermal protection installation. OV-102 will be modified to full operational status and OV-104 fabrication and assembly will proceed with major subcontractor effort accounting for much of this activity.

$262 million is required to continue main engine fabrication and assembly of Full Power Level (FPL) flight engines. FPL certification testing will be supported leading to certification of the FPL engines in FY 1983 for ten missions. Life maintenance demonstration testing will be initiated at the completion of FPL certification testing.

For KSC production activities we are requesting $67 million for design, installation, checkout and validation of the second line processing facilities, including the solid rocket booster segment processing and storage facility, the second launch pad and the DOD secure firing room.

$323.0 million is being requested for the spares and equipment needed to provide rate tooling to support external tank and solid rocket booster production and the procurement of orbiter flight spares and crew equipment commensurate with the operational flight rate buildup.

We are also requesting $60 million for performance augmentation to enhance Shuttle ascent performance. Some erosion in payload capability and performance margins has occurred as a result of growth in the system's inert weight, particularly in the orbiter. The augmentation of ascent performance is needed to support certain national security missions and in particular, a scheduled launch from the Western Space and Missile Center in 1985. Alternate performance augmentation studies were previously planned to extend through FY 1982. However, due to early completion of the necessary trade-off analyses and the requirement to initiate development as soon as possible to meet the 1985 mission date, we have selected an approach

which will reduce the inert weight of the solid rocket boosters by using filament wound motor case segments to replace the heavier steel cases. A reprogramming request to initiate development is now pending with the Committee to apply study funds previously requested in FY 1982 to initiate development.

Also included in this request is funding to support a demonstration of the space transportation systems's ability to support a mission to retrieve an operating spacecraft and repair it on orbit or return it to Earth for refurbishment. It has been determined that the Solar Maximum spacecraft, which is now partially disabled, will serve as the target for this demonstration. This mission would restore this spacecraft to full operational status for further important data gathering.

SPACE FLIGHT OPERATIONS

In Space Flight Operations we are requesting a total of $1.707 billion. Significant accomplishments in the past year include delivery of the Spacelab flight unit, flight of the first scientific payload on STS-2, and; in addition to the two successful Shuttle launches, a perfect record of 11 successful launches using Atlas-Centaur, Scout, Delta and Atlas-F vehicles.

STS operations activities provide continuing support for the integration of the Space Shuttle system, the Spacelab, Upper Stages and all ground launch and mission control facilities into a versatile and economical overall system to accomplish user mission objectives.

Shuttle operations funding of $1.414 billion constitutes the largest portion of the overall Space Flight Operations budget. It supports a schedule of five planned launches in FY 1983; ten launches in FY 1984 and 13 launches in FY 1985. Activities include mission planning and flight operations, orbiter launch and landing processing, cargo processing and payload integration, and procurement of external tanks, solid rocket boosters and spare equipment. Also included is upper stages operations funding required for the production, delivery and operation of the Air Force Inertial Upper Stage (IUS) and the Solid Spinning Upper Stage (SSUS). Two IUS's during FY 1983 will carry two Tracking and Data Relay Satellites (TDRS) from low-Earth to geosynchronous orbit.

STS operations capability development funding of $85.4 million will be used to support upper stage development, Multi-Mission and Payload Support Equipment, Mission Control Center (MCC) upgrading, Payload and Operations Support and STS Operations Effectiveness. Multi-Mission and Payload Support Equipment will be developed into a standard, reusable inventory of equipment which can be used for a variety of payloads. Mission Control Center upgrading funding will be

used to reconfigure the MCC at the Johnson Space Center with new equipment and software to support the requirements of the STS operational flight schedule. FY 1983 funding for Payload and Operations Support will be used to support the development and activity of the Payload Operations Control Center at the Johnson Space Center to support NASA Spacelab missions in conjunction with the MCC.

Upper stage vehicles under development are the Inertial Upper Stage (IUS) and the Solid Spinning Upper Stage (SSUS). For FY 1983 we are requesting $32 million for continuing the necessary activities to modify the two-stage IUS for NASA missions.

We are requesting $82.4 million to support the engineering and technical support base, formerly called development, test and mission support. This redefined program activity provides minimal core capability to sustain an engineering and development base to support various Space Transportation Systems programs. This core capability provides basically for a five day, one shift operation of designated institutional research and development facilities. Demands in excess of this support are being funded by the benefitting programs.

FY 1983 funding for STS Operations Effectiveness will be used to provide for improvements in STS vehicle hardware, vehicle turnaround and cargo processing, mission operations and system software automation. This funding will also support management studies to develop strategies to insure maximum utilization of the STS while reducing the cost and complexity of STS operations and evaluating possible scenarios for future institutionalization of the system.

Most of the $113.2 million funding for Spacelab in FY 1983 will be used to continue the procurement of the second flight unit and spares and to support the first Spacelab mission in late FY 1983. This funding will also be used to continue work on the first Spacelab crew transfer tunnel and to complete the Spacelab simulator at JSC to support crew training for the first mission. In addition, funds will be required for the Spacelab integration contractor to support preparations for the first flight, software using the Software Development Facility at the Marshall Space Flight Center, and to continue integration and checkout of the flight unit hardware and software at KSC.

For advanced programs we are requesting $11.9 million. Major emphasis will be placed on continuing studies, engineering investigations and definition of mission options made possible by the Space Transportation System. Options include unmanned platforms in both low-Earth orbit and geosynchronous orbit, a permanently manned facility in low earth orbit and various support elements.

EXPENDABLE LAUNCH VEHICLES

Our request of $42.8 million for Expendable Launch Vehicles (ELVs) will be used primarily for the Delta launch vehicles to support NASA missions scheduled for launch in FY 1983 and subsequent years. These missions are the Infrared Astronomy Satellite and Landsat-D[1] launched from the Western Space and Missile Center and the Active Magnetospheric Particle Tracer Explorer launched from the Eastern Space and Missile Center.

Major funding for the ELV program continues to come from the reimbursable users of NASA ELV launch services: the DOD for navigation and communications satellites; NOAA for weather satellites and a variety of domestic and international commercial communications payloads.

SPACE SCIENCE AND APPLICATIONS

The budget request for Space Science and Applications totals $998.3 million in FY 1983. Although the request is constrained, most of the spacecraft development projects presently underway continue unchanged. The funds will continue, as planned, the development of the Landsat-D advanced remote sensing satellite for launch later this year. The Space Telescope development is also proceeding on plan for launch in 1985.

The Galileo Jupiter orbiter and probe mission will also be launched in 1985, as planned. However, the launch vehicle will now be the two-stage IUS instead of the Centaur. This change of launch vehicle will require adding a propulsion stage to the Galileo spacecraft and modifying the trajectory so that the spacecraft will pick up energy through an Earth flyby. The Jupiter arrival date will be delayed by approximately two years with some increase in mission operations costs. The restructured single spacecraft International Solar Polar Mission will also be launched on a two-stage IUS with an additional propulsion module. The launch date remains in 1986.

Development of the Earth Radiation Budget Experiment is also proceeding smoothly. We will be ready to launch in 1983, though the actual launch dates that NOAA can support are currently under review. We will be prepared to launch our part of the Search and Rescue mission this year. Development of the experiments selected for flight on the Upper Atmosphere Research Satellite will assure, if full development of this mission is approved and initiated, that these instruments will be ready.

The Gamma Ray Observatory will move into its hardware phase for both spacecraft and instruments. Development is still proceeding on a schedule leading to launch in 1988. The Venus Orbiting Imaging Radar mission will not be funded in FY 1982 or FY 1983, in effect cancelling the mission.

Our Shuttle Spacelab Payloads program is moving ahead well. Payload flights on the STS support virtually the entire scope of science and applications disciplines. The life sciences and materials processing programs rely on the low gravity environment of space to resolve basic physiological and physics questions. Remote earth sensing payloads, such as the Radar Imaging Systems flown on STS-2, utilize the near-Earth vantage point of the Shuttle orbit to gain valuable insights into the significance of surface features and the processes that have formed and continue to form our Earth. Physics and astronomy payloads use the Shuttle orbiter to look outward from the Earth to study the Sun and its effects on the Earth and to study phenomena occurring at the outermost reaches of the Universe. We are now planning to use Spacelab flights to make detailed observations of Halley's Comet during its apparition in 1986.

In the Explorer program, which recently launched two Science and applications research satellites, the Solar Mesosphere Explorer and the Dynamics Explorer, the development of the Infrared Astronomy Satellite and the Active Magnetospheric Particle Tracer Explorer will continue with the launch of the Infrared Astronomy Satellite now scheduled for later this year. We will soon initiate development of the Cosmic Background Explorer. This series of low cost missions has made and will continue to make major contributions to science and applications objectives, albeit at a somewhat slower pace than anticipated earlier.

Supporting activities included in the request run from major continuing applications projects to balloon, aircraft and sounding rocket flights to small university research efforts. The Geodynamics Program uses sophisticated ground-based, as well as space-based systems, to improve our understanding of the dynamic processes occurring at the Earth's surface. Research efforts at universities continue the analysis of data from past programs, carry out complementary laboratory and theoretical research, and help us develop new program concepts. The supporting programs also make a substantial contribution in advancing technology so that these future missions can be accomplished. Such technology development ranges from large scale activities such as those in Multi-spectral linear array technology to the small efforts in defining individual instrument concepts.

AERONAUTICAL RESEARCH AND TECHNOLOGY

A total of $232 million is requested for Aeronautical Research and Technology. The request will provide for technology advances in all aeronautical disciplines, stressing the technology areas judged to be the most critical. The FY 1983 budget preserves a strong research and technology base in aerodynamics, propulsion, materials and structures, aircraft controls and guidance, and human factors, and maintains the experimental facilities and people dedicated to aeronautics at the NASA research centers.

Advances in fundamental research and technology efforts will be supported in the FY 1983 budget. Nonintrusive experimental test techniques and the development of analytical and computational methods will help us better understand and predict aerodynamic characteristics associated with the flow of air over a variety of aircraft shapes in order to reduce drag and improve performance. Computational methods will be used to predict complex internal flow through rotating blade rows in turbomachinery and to model combustion processes in engines in order to control emissions and better understand the impact of alternative fuels on engine performance. Research will continue on metallic, ceramic, polymer, and composite materials necessary for high-temperature engine applications and lightweight airframe structures; and analytical methods will be used to improve life prediction and better understand and control the dynamic response of complex aircraft and engine structures. Other important advances are expected in electronics, aircraft control system software and architectural concepts and crew station technology necessary to model pilot behavior in a multivariable environment.

Included in the FY 1983 research and technology base are fundamental supersonic research, critical resources technology and advanced guidance and flight controls research. The discipline and vehicle-oriented research and technology base efforts in the various speed regimes will continue to pursue wind-tunnel investigations on advanced aircraft and rotorcraft concepts and technology for future military aircraft, and to examine the effects of promising technology advances individually and in combination.

We will also pursue systems technology efforts in the areas applicable to high-speed and low-speed aircraft. These efforts are directly interdependent with Department of Defense aeronautical research programs and will be the only focused Systems Technology activity within NASA. The high-speed activity will investigate advanced technology and new configuration approaches in cooperative wind-tunnel and flight research programs with the Air Force, Navy, and Defense Advanced Research Projects Agency (DARPA). Activity in FY 1983 will involve a variety of high-performance aircraft to investigate advanced concepts, including: the Advanced Fighter Technology Integration (AFTI) F-111 aircraft, the AFTI/F-16 aircraft and HiMAT Remotely Piloted Vehicle. The joint NASA/DARPA X-29A Forward Swept Wing flight demonstration program will undergo extensive wind-tunnel tests, computational analysis and ground tests in preparation for flight test in FY 1984.

The Low-Speed Systems Technology program will focus on joint NASA/Army rotorcraft technology activities. The rotorcraft effort will include research on new rotor configurations, using the NASA/Army Rotor Systems Research Aircraft, noise technology, full-scale rotor/fuselage interference tests and human factors research.

SPACE RESEARCH AND TECHNOLOGY

The FY 1983 Space Research and Technology request of $123 million will focus on maintaining a strong research and technology base in the disciplinary areas of aerothermodynamics, chemical propulsion, materials and structures, electronics and automation, and space power and electric propulsion. The funding requested will also continue activity in information, spacecraft, and transportation systems research and technology. These efforts are designed to study the interrelationships of discipline technology from an integrated systems point of view, and are critical to the successful transition of technology from the laboratory to useful application. In addition, systems-level studies conducted within the research and technology base will continue to focus the disciplines and system research and technology activities in directions which will lead to maximum benefits from available resources. Finally, systems technology programs involving the extension of ground-based research and technology activities to space using Shuttle, Spacelab, and free-flying vehicles will be continued. During FY 1983, a number of space technology experiments will be performed aboard the Shuttle/Spacelab.

As a first step in addressing the future potential for maintenance of permanent manned presence in space, we have initiated an identification of the critical technology requirements to enable design and development of such systems. A Space Station Technology Steering Committee (SSTSC) has been established consisting of representatives from Headquarters and each of the NASA Centers. This Committee is in the process of identifying the top technology challenges and organizing working groups to develop and recommend technology plans that would underlie future options for such initiatives.

ENERGY TECHNOLOGY

NASA's role in the development of advanced technology for terrestrial energy has come at the request of the agencies directly involved in Energy research and development and the Congress. We have funded some NASA energy work and supported the energy programs of the Department of Energy and other agencies. With continuing reductions in civil service manpower, these efforts detract somewhat from our ability to carry out our responsibilities for aerospace research. We have attempted to minimize this impact by choosing areas of activity which produce technology advances of potential benefit to aeronautics and space. However, as we look ahead, we find it will be necessary for NASA to phase out of support to energy programs by the end of FY 1983 in order to devote the available manpower to our traditional programs. We will structure our plans such that the investments that have been made will be protected and a smooth transition to new management is carried out where appropriate.

SPACE TRACKING AND DATA SYSTEMS

To meet the requirements of all NASA flight projects, a total of $508.9 million is requested to provide for continuation of vital tracking, command, telemetry and data acquisition support for Earth-orbital spacecraft, including all phases of the Space Shuttle flight program, as well as support for planetary missions, sounding rockets and research aircraft. Funds are also required for operations support for the mission control centers, computation and data processing facilities and communications. In addition, beginning in FY 1983, we have included the cost of the initial incremental lease payment for Tracking and Data Relay Satellite System (TDRSS) services.

Our two networks, the Spaceflight Tracking and Data Network (STDN) and the Deep Space Network (DSN) provide worldwide support for both near-Earth orbiting satellites and deep space probes such as the encounter of the Voyager II spacecraft with Saturn in August 1981. These networks are preparing for a new era in data gathering capability with the advent of the TDRSS. Approximately 50 spacecraft, including the Space Shuttle and various planetary missions will be supported in FY 1983, along with intensive preparations for upcoming launches of approved programs such as Galileo, Space Telescope, Spacelab and TDRSS.

Some major activities to achieve economies during the past year include the closure of the ground STDN station in Quito, Ecuador, and the Tula Peak special purpose station in New Mexico, as well as a reduction in staffing at a number of tracking stations. Three 26-meter antennas of the Deep Space Network were also closed.

The TDRSS capability is planned to become fully operational in 1984. At that time, the TDRSS will support all low Earth-orbit spacecraft which will permit the closing of the majority of the worldwide STDN network. All other space missions, including planetary missions, such as the Voyager II encounter of Uranus in 1986, interplanetary spacecraft, and highly elliptical Earth-orbiting missions, will be serviced primarily from existing tracking station facilities in California, Spain, and Australia, which will be consolidated under the management of the Jet Propulsion Laboratory.

TECHNOLOGY UTILIZATION

For FY 1983, we are requesting $4 million for Technology Utilization to continue the transfer of NASA-developed technology to U.S. industry, the public and other government agencies. This represents a significant reduction from the current FY 1982 level of $8 million. While our primary focus will be on the continuation of active publication and technology dissemination activities, we will increase our efforts to acquire larger user contributions from both the private and public sectors. For example, we plan to continue phase zero feasibility and planning efforts in technology applications to define public sector applications projects in conjunction with other mission-oriented Federal agencies, with the view toward shifting budgetary responsibility for resultant projects to those user agencies. In addition, we will study the possibility of converting NASA Tech Briefs and other publications to paid subscription.

INTERNATIONAL COOPERATIVE ACTIVITIES

During this period of fiscal restraint, no nation can afford to pursue fully all scientific and technological opportunities. As a consequence, the many benefits that result from international cooperation such as access to foreign funds, foreign scientific and technological expertise, and foreign research and development facilities, become even more attractive. The 1980's will be a decade in which NASA will realize the benefits of many international activities begun in the 1970's, and will lay the groundwork for new and different forms of cooperation.

During the past year, several important milestones in some of our major cooperative projects were reached. For example, the Remote Manipulator System, which was developed, built and contributed by Canada, was successfully flown for the first time on STS-2. The European Space Agency recently delivered the first Spacelab flight unit to NASA; its maiden flight on the Shuttle is scheduled next year.

An increasing number of foreign nations are now well-equipped to participate fully in the exploration of space. Many have been actively involved for the past decade or more. Investments by foreign governments in space activities have steadily increased and we believe this trend will continue through the 1980s. This has the effect of generating competition in some areas, such as space launch vehicles, communications satellites and remote sensing systems. The United States must be prepared to meet this competition aggressively and we are taking a number of steps to help assure that U.S. space leadership is maintained. However, we need to keep in mind that these same increased capabilities and budgets can make foreign nations attractive as potential partners in future projects where it is in the U.S. interest to share costs or otherwise broaden support for its space activities.

CONSTRUCTION OF FACILITIES

The FY 1983 request for Construction of Facilities of $100 million has been limited to a constrained program that includes only minimum "hardcore" requirements in direct support of ongoing aeronautical and space programs and critical institutional base needs. Less than 15 percent of the request is for new construction, while the majority of the requirements are for modification, rehabilitation, or repair of existing facilities which will permit better utilization of the present physical plant and preclude some facilities becoming serious repair or replacement problems.

Approximately one-fourth of the funds requested are for the Space Shuttle and payload facilities work. The major requirements are for modifications of the manufacturing plant for the External Tank. These are required to provide a higher production rate capability than is presently available.

Major facility projects required for adequate support of aeronautical research and development comprise approximately $26 million of this request. These include modifications of two key wind tunnels at the Langley Research Center to improve testing precision and productivity.

The budget request also includes the continuing minor facilities work (minor construction, repair, and rehabilitation and modifications) that is critical to preserving the unique research and development capabilities of the NASA physical plant.

RESEARCH AND PROGRAM MANAGEMENT

The Research and Program Management request for FY 1983 is $1,178.9 million. About three-fourths of this account is required for civil service personnel salaries and related costs. About two percent is for travel which is vital to the management of our R&D programs. The balance is for facility support and related goods and services.

In 1981 two major institutional changes were implemented to improve the efficiency and effectiveness of operations. Last spring, Dryden Flight Research Center was made an integral part of the Ames Research Center, and the Wallops Flight Center part of the Goddard Space Flight Center. These actions were taken to focus the resources of each installation on what it can do best. The close relationship between Ames' and Dryden's efforts in aeronautical programs and Wallops' and Goddard's efforts in sounding rocket and airborne experiment programs provide an opportunity to improve overall program effectiveness through these consolidations.

Last fall an organizational change was made in Headquarters to assure the proper delegation of authority to all line managers, to set forth a clear distinction between line and staff, and to simplify and clarify Field Centers' reporting lines. The chief institutional change was to place centers under the managerial control of the Program Office from which they had already been receiving most of their programmatic directions. The Johnson Space Center, the Kennedy Space Center, the Marshall Space Flight Center and the National Space Technology Laboratories report to the Associate Administrator for Space Transportation Systems; the Ames Research Center, the Langley Research Center and the Lewis Research Center to the Associate Administrator for Aeronautics and Space Technology; and the Goddard Space Flight Center to the Associate Administrator for Space Science and Applications.

In FY 1982, we are reducing our permanent civil service workforce by 221 below the amended 1982 budget. This brings the civil service reduction from the original 1982 plan submitted a year ago to 1,061, a reduction of almost 5%. In 1983, we will reduce the permanent civil service workforce by another 433, and NASA will be at its lowest civil service complement in over 20 years. We believe that we can achieve these reductions in a manner to minimize detrimental impacts, on NASA's programs and capabilities and on the individuals involved, while supporting fully our national commitments.

Requested increases, other than those for personnel and related costs, reflect only the amounts required to meet expected FY 1983 levels for support service contractor wage rates, utility rates and price levels for supplies, materials, equipment and other purchased services.

Even with significant civil service personnel reductions, NASA has been able to improve the ratio of minority and female professional employees in the Agency workforce. In 1981, the ratio of female professionals rose from 10.5% to 11.6%, and for minority employees from 11.0% to 11.3%.

CONCLUSION

In conclusion, this request represents a program which supports the major priorities of the Administration. It fully funds the Space Shuttle program and those aeronautics and space efforts related to national security while deferring or eliminating programs which could be performed by the private sector. In this context I believe it represents a balanced program which will provide the basis for future programs to exploit the full potential of the Space Transportation System.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

BUDGET SUMMARY
(Thousands of Dollars)

	Budget Plan		
RESEARCH AND DEVELOPMENT	FY 1981	FY 1982	FY 1983
Space Transportation Systems	2,728,600	3,090,100	3,467,800
Space Shuttle	1,995,000	2,163,000	1,718,000
Space flight operations	679,200	895,900	1,707,000
Expendable launch vehicles	54,400	31,200	42,800
Space Science	541,488	568,000	682,000
Physics and astronomy	323,700	323,500	471,700
Planetary exploration	175,600	205,000	154,600
Life sciences	42,188	39,500	55,700
Space and Terrestrial Applications	340,350	333,800	320,300
Space applications	331,550	325,800	316,300
Technology utilization	8,800	8,000	4,000
Aeronautics and Space Technology	384,000	344,000	355,000
Aeronautical research and technology	271,400	233,000	232,000
Space research and technology	110,700	111,000	123,000
Energy	1,900	---	---
Tracking and Data Acquisition	339,900[a/]	402,100[a/]	508,900
TOTAL RESEARCH AND DEVELOPMENT	4,334,338	4,738,000	5,334,000
CONSTRUCTION OF FACILITIES	116,950[a/]	98,700[a/]	100,000
RESEARCH AND PROGRAM MANAGEMENT	1,071,064	1,144,700[b/]	1,178,900
TOTAL	5,522,352	5,981,400	6,612,900
OUTLAYS	5,421,300	5,826,500	6,576,100

a/ Reflects reprogramming of R&D funds to CoF: 1981 program $1.2M, 1982 program $2.9M.
b/ Includes increased pay costs of $41.4M.